



# PHYSICS NMDCAT

TOPIC WISE TEST (UNIT-4)

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**03418729745(WhatsApp Groups)**

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**TOPIC:**

✓ **Waves**

- Q. 1** A wave generator produces 500 pulses in 10 seconds. Find period of pulses it produces
- A. 50s  
B.  $\frac{1}{50}$  s  
C.  $\frac{1}{5}$  s  
D.  $\frac{10}{50}$  s
- Q. 2** The speed of sound in the direction of wind relative to ground (where v is speed of sound and  $v_w$  is speed of wind)
- A. v  
B.  $v - v_w$   
C.  $v + v_w$   
D.  $v \pm v_w$
- Q. 3** The speed of a wave on a particular string is  $24 \text{ ms}^{-1}$ . If string is 6m long. Find its fundamental frequency
- A. 2 Hz  
B. 6 Hz  
C. 4 Hz  
D. 8 Hz
- Q. 4** The restoring force of SHM is maximum when particle:
- A. Displacement is maximum  
B. Half way between them  
C. Crossing mean position  
D. At rest
- Q. 5** In Doppler effect if the source moves towards the observer, the spectral line are shifted towards the
- A. Blue end of spectrum  
B. Either end of the spectrum  
C. Red end of spectrum  
D. None of these
- Q. 6** The distance between two consecutive antinodes is 0.5m. The distance travelled by the wave in half the time period is
- A. 2 m  
B. 0.5 m  
C. 1 m  
D. 0.25 m
- Q. 7** The phase difference between the particles vibrating at two consecutive nodes is:
- A. Zero  
B.  $\pi$   
C.  $\frac{\pi}{2}$   
D.  $2\pi$
- Q. 8** The third harmonic in an open organ pipe is known as
- A. Fundamental frequency  
B. Third overtone  
C. Second overtone  
D. First overtone
- Q. 9** Which of the following laws of strings is not correct? Where "f" is frequency of string.
- A.  $f \propto \frac{1}{\sqrt{m}}$   
B.  $f \propto \sqrt{T}$   
C.  $f \propto \ell$   
D.  $f \propto \frac{1}{\ell}$
- Q. 10** Which of the property makes difference between progressive and stationary waves
- A. Amplitude  
B. Frequency  
C. Propagation of energy  
D. Phase of the wave
- Q. 11** The first overtone of a stretched wire of given length is 320 Hz. The first harmonic is:
- A. 320 Hz  
B. 160 Hz  
C. 480 Hz  
D. 640 Hz

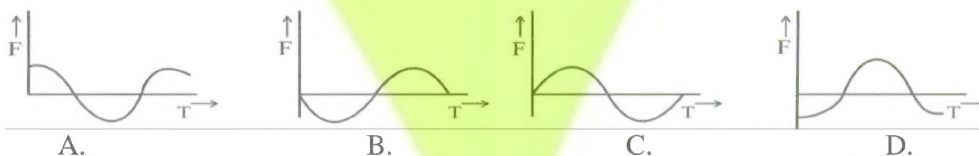
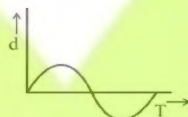


- Q. 12 When an observer is approaching a stationary source with a velocity  $v_o$  then the apparent change in frequency observed by him will be:
- A.  $\frac{v}{v + v_o} f$  B.  $\left(1 + \frac{v_o}{v}\right) f$   
C.  $\frac{v}{v_o} f$  D.  $\frac{v_o}{v} f$
- Q. 13 A source of sound of frequency 450 cycles/sec is moving towards a stationary observer with 34 m/sec speed. If the speed of sound is 340 m/sec, then the apparent frequency will be
- A. 410 cycles/sec B. 500 cycles/sec  
C. 550 cycles/sec D. 450 cycles/sec
- Q. 14 Sonar is used to detect
- A. Depth of sea B. Under sea objects  
C. Location of submarine D. All of these
- Q. 15 What would be the effect of increasing tension of stretched string on velocity of waves
- A. Increases B. Decreases  
C. Remain unchanged D. None of these
- Q. 16 If water waves oscillates up and down three times each second and distance between waves crest is 2, what is its wave speed.
- A. 3m/s B. 6m/s  
C. 1.5m/s D. 9m/s
- Q. 17 The essential properties of a medium for the propagation of mechanical waves are
- A. Inertia and mass B. Inertia and elasticity  
C. Elasticity only D. Inertia only
- Q. 18 What is the ratio of velocity to fundamental frequency for a closed organ pipe of length  $l$  ?
- A. 0 B.  $l$   
C.  $2l$  D.  $4l$
- Q. 19 The frequency of a sound wave is  $n$  and its velocity is  $v$ . If the frequency is increased to  $4n$ , the velocity of the wave will be
- A.  $v$  B.  $2v$   
C.  $4v$  D.  $v/4$
- Q. 20 The nature of sound waves in gases is
- A. Transverse B. Longitudinal  
C. Stationary D. Electromagnetic
- Q. 21 The distance between a node and the next anti node of a stationary wave is 33 cm. If the velocity of sound is 330 m/s. The frequency is
- A. 150 Hz B. 200 Hz  
C. 250 Hz D. 300 Hz
- Q. 22 When an aero plane move towards airport, then the frequency of reflected wave from the aeroplane received by radar
- A. Decreases B. Increases  
C. Remain some D. Become zero
- Q. 23 The frequency of a rod is 200 Hz. If the velocity of sound in air is  $340 \text{ ms}^{-1}$ , the wavelength of the sound produced is
- A. 1.7 cm B. 6.8 cm  
C. 1.7 m D. 6.8 m
- Q. 24 An observer moves towards a stationary source of sound, with a velocity one fifth of the velocity of sound. What is the percentage increase in the apparent frequency?
- A. zero B. 0.5%  
C. 5% D. 20%
- Q. 25 Standing waves are produced in 10m long stretched string. If string vibrates in 5 segments and wave velocity is 20m/s, what is the frequency?
- A. 10Hz B. 5Hz





- C. 20Hz  
D. 4Hz
- Q. 26 If a string is fixed at both ends vibrates in “n” loops, then wave-length in term of length ‘ $\ell$ ’ of string is given by
- A.  $\frac{n\ell}{2}$   
B.  $\frac{\ell}{2n}$   
C.  $\frac{2\ell}{n}$   
D.  $\frac{2\ell}{v}$
- Q. 27 When two identical traveling waves are superimposed, velocity of resultant wave
- A. Decreases  
B. Increases  
C. Remains same  
D. Becomes zero
- Q. 28 The distance between 1<sup>st</sup> node and 4<sup>th</sup> antinode is:
- A.  $\frac{7}{4}\lambda$   
B.  $5\frac{\lambda}{4}$   
C.  $13\frac{\lambda}{4}$   
D.  $11\frac{\lambda}{4}$
- Q. 29 In the stretched string if speed of the wave is doubled, the tension will be
- A. 2 times  
B. 4 times  
C. 8 times  
D. 6 times
- Q. 30 Displacement time graph of particle executing SHM is shown. The corresponding force-time graph of particle is



- A. B. C. D.
- Q. 31 The distance covered by a body in one complete vibration is 20cm. What is the amplitude of body
- A. 10 cm  
B. 15 cm  
C. 5 cm  
D. 7.5 cm
- Q. 32 If V is the speed of sound at pressure P then speed of sound at 2P, keeping temperature constant, will be
- A. 1 : 2  
B. 1 : 1  
C. 2 : 1  
D.  $\sqrt{2} : 1$
- Q. 33 Which of the following has maximum value of  $\gamma = \frac{C_p}{C_v}$
- A. Monoatomic gas  
B. Polyatomic gas  
C. Diatomic gas  
D. All have same value
- Q. 34 Velocity of sound in air
- A. Decreases with increase in temperature  
B. Increase with decrease in temperature  
C. Decreases with decrease of temperature  
D. Does not depend on temperature
- Q. 35 At what temperature, the velocity of sound will be double its value at 273 K?
- A.  $2 \times 273$  K  
B.  $8 \times 273$  K  
C.  $4 \times 273$  K  
D.  $16 \times 273$  K
- Q. 36 Doppler's effect will not be applicable when the velocity of sound source is
- A. Equal to that of the sound velocity  
B. Less than the velocity of sound  
C. Greater than the velocity of sound  
D. Zero
- Q. 37 For all gases
- A.  $v_t = v_o \sqrt{1 - \frac{t}{273}}$   
B.  $v_t = v_o \sqrt{1 + \frac{t}{273}}$



C.  $v_t = v_o \sqrt{1 + 273t}$

D.  $v_t = v_o \sqrt{1 + \frac{273}{t}}$

**Q. 38** A source emits a sound of frequency of 400 Hz, but the listener hears it to be 390 Hz. Then

- A. The listener is moving towards the source
- B. The source is moving towards the listener
- C. The listener is moving away from the source
- D. The listener has a defective ear

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- Q. 39** Sound travels faster in moist air at STP because
- Moist air is heavier than dry air
  - The pressure of moist air is greater than that of dry air
  - The value of  $\gamma$  of moist air is greater than that for dry air
  - The density of moist air is less than that of dry air
- Q. 40** Newton assumed that sound propagation in a gas takes place under
- Isothermal conditions
  - Isobaric condition
  - Adiabatic conditions
  - Isochoric condition
- Q. 41** If  $v_a$ ,  $v_h$  and  $v_m$  are the speeds of sound in air, hydrogen and a metal at the same temperature, then
- $v_h > v_a > v_m$
  - $v_m > v_h > v_a$
  - $v_h > v_m > v_a$
  - $v_a > v_h > v_m$
- Q. 42** A tuning fork completes 20 vibrations in 0.4 s. its frequency in ( $s^{-1}$ )
- 50
  - 60
  - 100
  - none of these
- Q. 43** If the number of loops of a stationary wave are increasing, then
- $\lambda$  increases
  - $\lambda$  decreases
  - $\lambda$  remains same
  - $\lambda$  may increase or decrease
- Q. 44** A rope of length 5 m is stretched to a tension of 80 N. If its mass is 1 kg, at what speed would a 10 Hz transverse wave travel down the string?
- 2 m/s
  - 5 m/s
  - 20 m/s
  - 50 m/s
- Q. 45** At which temperature the speed of sound in hydrogen will be same as that of speed of sound in oxygen at  $100^\circ\text{C}$
- $-148^\circ\text{C}$
  - $-212.5^\circ\text{C}$
  - $-317.5^\circ\text{C}$
  - $-249.7^\circ\text{C}$
- Q. 46** A stationary wave is set up in the air column of a closed pipe. At the closed end of the pipe:
- Always a node is formed
  - Always an antinode is formed
  - Neither node nor antinode is formed
  - Sometimes a node and sometimes an antinode is formed
- Q. 47** A string, clamped at its ends, vibrates in three segments. The string is 100cm long. The wavelength is:
- 33.3cm
  - 150cm
  - 66.7cm
  - 300cm
- Q. 48** A police motor cycle running at 130 Km/hr sounds a siren of 2 KHz frequency while chasing a car running at 150 Km/hr. the apparent frequency of the siren heard by the car driver will be:
- Greater than 2 KHz
  - 2 KHz
  - The siren will not be heard by the car driver
  - Less than 2 KHz
- Q. 49** Length of a string tied to two rigid supports is 40 cm. Maximum length (wavelength in cm) of a stationary wave produced on it, is
- 20
  - 10
  - 80
  - 40
- Q. 50** In strings, the position of antinodes are obtained at
- $\lambda, 2\lambda, 3\lambda$
  - $2\lambda, 4, 6\lambda$
  - $0, \frac{\lambda}{2}, \lambda$
  - $\frac{\lambda}{4}, \frac{3\lambda}{4}, \frac{5\lambda}{4}$

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# Phy T-4

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Regards.Huzaiifa Saeed,Usama Sohail

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